

Respective impact of passive immune transfer and energy provision on puppies survival

Oral - Abstract ID: 181

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Introduction

Puppies survival depends on passive immune transfer (illustrated by blood immunoglobulins G at two days of age [1]) and energy supply (pictured by growth rate over the two first days of life [2]). The objective of this work was to estimate the respective impact of energy and immunity on puppies health and survival.

Materials et methods

Within a large multiracial breeding kennel, puppies were weighted at birth (Day 0) and at Day 2. Jugular blood was also collected at Day2 for blood immunoglobulins G assay (Dog ELISA Quantitation set, Bethyl Lab, Montgomery, USA). Passive immune transfer was considered correct when blood IgG concentration ([IgG]) was higher than 2.3g/l [1]. Growth rate D0-D2 was calculated as (Weight Day 2 – Weight Day 0)/Weight Day 0 x 100. Growth was considered correct when puppies do not loose more than 4% of their birth weight (growth rate D0-D2 higher than -4%) [2]. Mortality was examined from Day 2 until Day21. Mortality rates were compared by Chi square test with Bonferroni correction. Results are presented as mean \pm SD.

Results

Over 300 puppies born from 59 bitches (15 breeds), 284 puppies were alive at Day 2, among which 33.2% were in deficit of passive immune transfer and 25.8% suffered from insufficient growth. Among puppies with correct growth (n=211), 82% achieved a correct passive immune transfer vs 23% for puppies with insufficient growth. Further neonatal mortality rate until Day 21 was 13.0%. In puppies with correct passive immune transfer and correct growth (IgG+GR+, n=173; 60.8% of the total number of puppies alive at Day2), neonatal mortality rate was 3.5%. In case of insufficient passive immune transfer but correct growth (IgG-GR+, n=38; 13.4%), mortality rate was 10.5%. In the mirror situation (correct passive immune transfer but insufficient growth, IgG+GR-, n=17; 6.0%), mortality rate was 23.7%. For puppies with both insufficient passive immune transfer and insufficient growth (IgG-GR-, n=56; 19.8%), it was increased up to 41%. Difference was significant between IgG+GR+ group vs IgG-GR- ($p<0,001$) and vs IgG+GR- ($p=0,007$).

Conclusion

This work demonstrated that both insufficient passive immune transfer and energy intake over the first two days of life increased the risk of neonatal mortality and that their effects are cumulative. It also evidenced that both situations are very frequent among puppies. This study stresses on the importance of an early ingestion of a maximal quantity of colostrum. Moreover, it implies that colostrum substitutes have to combine immune and energy supply.

[1] Mila et al 2014 Prev Vet Med 116:209–213. [2] Mila et al 2015 J Anim Sci 93(9):4436-42.



XXth EVSSAR Congress

Reproduction and Pediatrics in Dogs, Cats and Small Companion Animals

University of Veterinary Sciences Vienna, Austria
29. June -1. July 2017



Editors: Sabine Schäfer-Somi, Ragnvi Hagman, George Mantziaras